Firearm Homicide and Suicide in Michigan

Michigan Department of Community Health

MDCH

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EXECUTIVE SUMMARY

In 2002, a statewide task force identified firearm homicides and suicides as a priority area for injury prevention in Michigan. The task force developed recommendations for infrastructure to support firearm injury prevention, data collection, evidence-based interventions, technical support and training, and public policy. This report addresses the recommendation for data collection by providing a descriptive analysis of firearm homicides and suicides using death certificates and Supplementary Homicide Reports. It provides some comparative data on non-fatal hospitalizations. It illustrates reported firearm ownership and storage practices using data from the Behavioral Risk Factor Survey. The report estimates the cost of these fatal injuries using cost estimates developed in a 2001 study of Michigan injuries. The salient findings are as follows:

All Firearm Fatalities

- Between 1999 and 2003, an average of 1,066 Michigan residents died each year due to firearm injuries. Suicide and homicide were the cause of death in 51% and 46% of cases, respectively. The remainder were unintentional, undetermined intent and legal intervention.

Firearm Homicides

- Firearms were used in 71% of Michigan resident homicides during 1999-2003.
- There were an average of 494 firearm homicides annually during this period.
- The firearm homicide rate for blacks was twenty times the rate for whites.
- The rate for males was more than five times the rate for females.
- The highest rate was for black males aged 20-24. Their rate was thirty four times the overall rate.
- Hospitalization data identified the same demographic groups at high risk for non-fatal firearm assault injuries.
- Between 1990 and 2003, the firearm homicide rate in Michigan declined 41%. During that period, Michigan's rates were consistently higher than national rates.
- Other than Wayne County, every county in the state had a rate less than 7 deaths per 100,000 population. The rate among Detroit City residents was 32.5 per 100,000.
- Handguns were used in 85% of the cases in which the type of firearm was known.
- The relationship between the victim and the suspect was recorded in Supplementary Homicide Reports as unknown for more than half of firearm homicides. The victim and suspect were strangers in only 19% of the cases where the relationship was known.
- Supplementary Homicide Reports frequently did not specify demographic characteristics of suspects (40% of cases had no information on suspect age, sex, or race). Among the cases with known demographics, 95% of the suspects were male and 81% were black.

Firearm Suicides

- Firearms were used in 53% of Michigan resident suicides during 1999-2003.
- There were an average of 540 firearm suicides annually during this period.
- The firearm suicide rate for whites was 66% greater than the rate for blacks.
- The rate for males was more than eight times the rate for females.
- The highest rate was for white males aged 75 and older. Their rate was five times the overall rate.
- It was not possible to clearly define high risk demographic groups for non-fatal hospitalizations for firearm suicide attempts because of small numbers (42 cases a year between 1999 and 2003).

Firearm Suicides (continued)

- Between 1990 and 2003, the firearm suicide rate in Michigan declined 24%. During that period, Michigan's rates were consistently lower than national rates.
- There was no geographic pattern to firearm suicide rates. Rates generally were highest in lower populated counties, but these rates were based on small numbers (< 6 per year) of cases. None of the ten most populous counties had rates that exceeded the state rate.

Firearm Ownership and Storage Practices

- In a 2002 survey, 40.5% of Michigan residents reported having a firearm at home. This exceeded the prevalence of firearm ownership nationally (32.6%).
- One in thirty Michigan adults reported having a loaded, unlocked firearm at home.

Cost of Firearm Homicides and Suicides

- Firearm homicides to Michigan residents occurring in 2003 resulted in an estimated $3.3 million in medical costs and $518 million in work-loss costs.
- Firearm suicides that same year resulted in an estimated $3.3 million in medical costs and $410 million in work-loss costs.

This study was limited by the high proportion of firearm homicides for which there was no information on firearm type and perpetrator characteristics. In addition, it is unknown if Michigan residents either failing to participate in the Behavioral Risk Factor Survey or refusing to answer questions about firearm ownership and storage were similar to those who did respond. Finally, cost estimates were based on applying a national paradigm to Michigan data rather than directly measuring costs.

In 2006, the Firearm Workgroup of the statewide injury prevention taskforce will be reconvened to document progress toward the firearm-related recommendations in the state plan and to develop an action plan to provide direction for future initiatives related to firearm-related suicide and homicide prevention.

Questions or comments concerning this report should be directed to Linda Scarpetta, Michigan Department of Community Health, at (517) 335-8397 or e-mail at scarpettal@michigan.gov.

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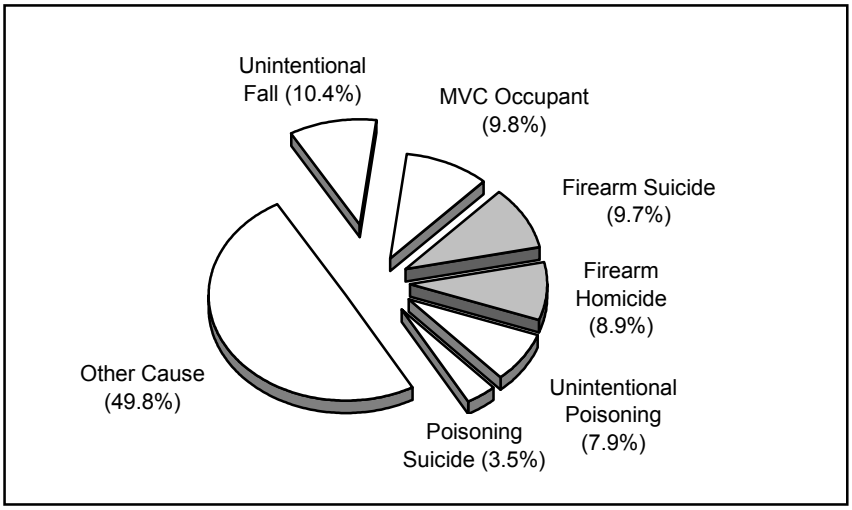
INTRODUCTION

In October 2000, the Michigan Department of Community Health (MDCH) Injury and Violence Prevention Section received a Core Injury Capacity-Building grant from the Centers for Disease Control and Prevention (CDC). As part of this grant, a statewide taskforce was convened and provided input for the development of a state plan[1] for injury prevention. One component of this process was the identification of priority areas for injury prevention in the state. The taskforce evaluated the magnitude, severity and preventability of various causes of injury and identified four priority areas: 1) unintentional falls in adults age 65 and older; 2) poisonings (unintentional and suicidal); 3) firearm-related homicides and suicides; and 4) motor vehicle crashes (MVC) causing injuries to vehicle occupants.

Figure 1 illustrates the proportion of priority causes of injury among injury deaths in 2003. Taken together, firearm homicides and suicides were the leading cause of fatal injuries.

FIGURE 1
Injury Prevention Taskforce priority causes of injury
Michigan resident injury deaths, 2003 (N=5,337)



Source: Vital Records and Health Data Development Section, MDCH

This report provides basic descriptive information on firearm homicides and suicides using available data sources. Establishing an accurate profile of the magnitude of this issue and identifying groups at especially high risk is an essential first step in developing well-targeted interventions.

DATA SOURCES AND METHODS

Data Sources

Death certificates were the source of data for firearm deaths. Funeral directors, attending physicians, and medical examiners document cause of death and demographics of the decedent on the death certificate. These data are aggregated and maintained by the MDCH Vital Records and Health Data Development Section. MDCH maintains data on all deaths occurring within Michigan and on Michigan resident deaths occurring out-of-state. Mortality data for the United States were obtained from the Web-based Injury Statistics Query and Reporting System (WISQARS)[2] which is managed by the Centers for Disease Control and Prevention (CDC).

The Michigan Inpatient Database (MIDB) was the source of data on hospitalizations. The MIDB is the aggregation of hospital discharge data voluntarily provided to the Michigan Health and Hospital Association (MHA) by virtually every acute care hospital in Michigan (one very small hospital does not participate). In addition, hospitals in contiguous states (Indiana, Ohio, and Wisconsin) submit data on hospitalized Michigan residents to the MHA.

Supplementary Homicide Reports (SHR) were the source of information on firearm type used in homicides and on characteristics of suspects. SHRs are completed by local police departments as part of the Federal Bureau of Investigation (FBI) Uniform Crime Reporting system and subsequently submitted to the Michigan State Police. Data are not updated after they are submitted to reflect the results of subsequent investigation. SHRs are used to record intentional homicides — premeditated and nonpremeditated — and unintentional or negligent homicides.

The 2002 Michigan Behavioral Risk Factor Survey (BRFS) was the source of information on firearm ownership and storage practices. The BRFS is an ongoing telephone survey of residents age 18 and older. All fifty states conduct similar surveys as part of the Behavioral Risk Factor Surveillance System, which is coordinated and supported by the CDC. [Detailed methodological information on the BRFS is available elsewhere.[3]] For the 2002 Michigan BRFS, data were collected quarterly by the Institute for Public Policy and Social Research at Michigan State University. The total sample size of completed interviews was 5,934. The household-level cooperation rate* was 78.0%.

The Division for Vital Records and Health Statistics (DVRHS) in the Michigan Department of Community Health provided population figures for the state, age/sex/race groups, and county of residence for the period 1990-2003.[4] The DVRHS cited these figures as estimates derived by a collaborative effort between the National Center for Health Statistics and the United States Census Bureau.

The costs associated with firearm homicides and suicides were calculated utilizing data from a 2001 study[5] which estimated the lifetime costs due to medical care and workloss from all causes of injury among Michigan residents during 1997-1998.** Definitions of medical and work-loss costs are provided in Appendix C. These estimated costs were generated by applying a

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* The "cooperation rate" is the proportion of all cases interviewed of all eligible household units that were actually contacted. The denominator of the rate includes completed interviews plus the number of non-interviews that involve the identification of and contact with an eligible respondent.

** The study also estimated costs associated with quality-adjusted life years (QALY) lost. An analysis of QALY was not included for this report because it involves calculating costs by placing a dollar value on life, a less tangible "cost" than medical care or lost worktime.

nationally-developed paradigm to Michigan data. The process did not involve obtaining actual direct or indirect costs associated with injuries occurring in Michigan. Details on the methodology used to generate cost estimates can be found in the referenced study.

Methods

Using death certificate data, a firearm homicide was defined as a death to a Michigan resident for which the underlying cause was coded within the ICD-9[6] range E965.0 – E965.4 (for deaths prior to 1999) and ICD-10[7] range X93 – X95 (for deaths in 1999 and thereafter). Firearm suicides were defined by the ICD-9 codes E955.0 – E955.4 and ICD-10 codes X72 – X74.

Five years (1999-2003) of mortality data were used rather than a single year to improve the capability to generate statistically valid rates. To examine trends, data for 1990-2003 were utilized. An important consideration when examining mortality trends over this timeframe is that the system of coding deaths changed significantly in 1999. This was the first year in which deaths were coded using ICD-10; from 1979 to 1998, deaths had been coded using ICD-9. The CDC National Center for Health Statistics evaluated the effects of implementing ICD-10 on mortality statistics for selected causes of death.[8] They found that the change from ICD-9 to ICD-10 coding by itself would increase the number of fatal injuries coded as firearm homicides and firearm suicides by 0.19% and 0.12%, respectively.[9] Thus, the change in coding systems had a negligible effect on the enumeration of firearm homicides and suicides.

To calculate mortality rates using the 1999-2003 data, the average annual number of deaths was divided by the appropriate 2001 population; the result was multiplied by 100,000. For temporal analyses, the annual number of deaths was divided by the population for that year and multiplied by 100,000. The data for the national number of deaths and corresponding death rates were ascertained directly from WISQARS.

Using hospital discharge data, a firearm assault case was defined as a non-fatal discharge for which the patient had a principal diagnosis of injury, i.e., in the ICD-9-CM[10] range 800 – 909.2, 909.4, 909.9, 910 – 994.9, 995.50 – 995.59, 995.80 – 995.85, and an external cause of injury code ("E-code") in the range E965.0 – E965.4. Firearm suicide attempts were defined by the E-code range E955.0 – E955.4. Five years of hospitalization data (1999-2003) were used to be consistent with mortality data. Note that over this period, hospitals had an E-coding rate of 85% (i.e., for 15% of injury hospitalizations, a code indicating the cause of injury was not provided). Rates were calculated by dividing the annual average number of hospitalizations by the appropriate 2001 Michigan population and multiplying the result by 100,000.

Using data from Supplementary Homicide Reports (SHR), a homicide (or "murder") was defined as the intentional or non-negligent taking of another's life. Excluded were unintentional or negligent homicides and acts of self-defense. Data were aggregated for the same five-year period, 1999-2003, as the death certificate data. SHR used 26 categories to indicate victim-suspect* relationship in firearm homicides. For simplicity, categories were combined to yield eight broader relationship types.

The 2002 BRFS data used in this report were taken directly from a published Michigan Department of Community Health report.[11] Data collection methods are presented in that report.

* The term "suspect" is used rather than "offender" or "perpetrator" because at the time of the collection of data, the suspect may not have legally been determined to be the actual offender.

Respondents who responded to questions with "Don't know" or refused to answer were not included in the calculation of estimates.
The 2001 report on Michigan injury costs provides age-specific medical cost per incident for firearm homicides and suicides in 1997 dollars. The medical cost for deaths occurring in 2003 was calculated by: 1) converting 1997 cost figures into 2003 dollars using the inflation rate over the six-year period; 2) generating the frequency of deaths by age group; 3) multiplying the number of deaths in each age group by the 2003 cost per incident; and 4) summing the age group costs. The report did not provide per incident work-loss costs. These were derived using available data on annual costs and incidence.

Rates based on less than six cases were not calculated due to the corresponding lack of statistical stability. In the tables, such instances are noted with an "*". Cells in which no cases occurred are noted by a "-".

Symbols Used in Tables	
No cases occurred within category	-
Quantity greater than zero but less than 0.5	0
Rate is considered statistically unreliable	*

RESULTS

Between 1999 and 2003, an average of 540 Michigan residents died each year due to firearm suicide and 494 died due to firearm homicide (Table 1). These two causes of firearm death comprised 97% of firearm fatalities during this time period.

TABLE 1
Average annual number of firearm deaths, by incident type
Michigan residents, 1999-2003

Incident Type	Number	%
Suicide	540	50.7
Homicide	494	46.3
Unintentional	14	1.3
Undetermined Intent	7	0.7
Legal Intervention	10	0.9
Total	1,066	100.0

Cells do not sum to total due to rounding.
Source: Vital Records and Health Data Development Section, MDCH

Firearm Homicides

Firearms are by far the leading mechanism for homicide in Michigan. Nearly three-quarters of all homicides between 1999-2003 were committed by a firearm (Table 2).

TABLE 2
Average annual number of homicides, by mechanism
Michigan residents, 1999-2003

Mechanism	Number	%
Firearm	494	70.9
Sharp Object	63	9.0
Suffocation	27	3.9
Fire/Flames	10	1.4
Struck by Person/Object	5	0.7
Other	58	8.3
Unspecified	39	5.6
Total	697	100.0

Cells do not add to total due to rounding.
Source: Vital Records and Health Data Development Section, MDCH

Victim Demographics

Table 3 illustrates the average annual number of firearm homicides among Michigan residents during 1999-2003 by age group, sex, and race of the victim. The corresponding annual rates are presented in Table 4. The rate for blacks was twenty times the rate for whites. The rate for males was more than five times the rate for females. For males, rates clearly peaked among those aged 20-29. While the highest rates among females were in the younger age groups (15-44), there was no clear peak. The highest overall rate was among 20-24 year old black males. Their rate was thirty four times the overall rate. An analysis of 1999-2003 non-fatal injury hospitalizations yielded these same characteristics only more pronounced (see Tables B-1 and B-2 in Appendix B).

Trends

Between 1990 and 2003, the Michigan firearm homicide rate was highest in 1991 (8.3 deaths per 100,000 residents) and lowest in 2003 (4.7 per 100,000) (Table 5). The rate decreased 41% from 1990 to 2003 (Figure 2). National rates had the same pattern as Michigan rates over the fourteen year period. Michigan rates consistently exceeded national rates, generally between 10% and 20% each year.

Rates decreased substantially for white males and females and black males and females (Figure 3 and Table A-1 in Appendix A). The largest percentage decrease was for white females (57%). Rates for Hispanics were similar to those of non-Hispanics over the fourteen year period (Figure 4 and Table A-2 in Appendix A).

County of Residence

The average annual number of firearm homicides during 1999-2003 and the corresponding rate for each county and the City of Detroit are presented in Table 6. Every county in the state except Wayne County had a rate less than 7 deaths per 100,000 population. Wayne out-county had a rate of 3.8 per 100,000, but the rate among Detroit City residents was 32.5 per 100,000. Genesee and Saginaw Counties had rates that exceeded the state rate.

TABLE 3
Average Annual Number of Deaths Due to Firearm Homicides
By Age, Race, and Sex
Michigan Residents, 1999-2003

Age	White			Black			Other			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	-	0	0	-	-	-	-	-	-	-	0	0
1-4	1	-	1	0	1	1	-	-	-	1	1	2
5-9	0	1	1	1	1	2	-	-	-	2	2	3
10-14	1	0	2	2	0	3	-	-	-	4	1	4
15-19	7	3	9	35	5	40	0	0	0	42	8	50
20-24	14	3	17	88	7	95	1	-	1	103	10	113
25-29	9	2	11	76	7	83	0	-	0	85	9	94
30-34	10	4	14	54	7	61	0	0	0	65	11	75
35-44	17	10	28	50	9	59	1	0	2	69	19	88
45-54	8	4	12	23	5	29	0	-	0	32	9	41
55-64	5	2	7	6	0	6	0	-	0	11	2	13
65-74	2	1	3	3	1	3	-	-	-	5	2	7
75+	1	1	2	1	0	1	-	-	-	2	1	4
Total	76	32	108	340	42	383	3	1	4	419	75	494

Includes ICD-10 codes: X93 – X95.
Decedent with unknown race (n=1) not illustrated but included in totals.
Numbers in columns and rows may not total exactly due to rounding.
Source: Vital Records and Health Data Development Section, MDCH

TABLE 4
Average Annual Death Rates Due to Firearm Homicides
By Age, Race, and Sex
Michigan Residents, 1999-2003

Age	White			Black			Other			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	-	*	*	-	-	-	-	-	-	-	*	*
1-4	*	-	*	*	*	1.4	-	-	-	0.4	*	0.4
5-9	*	*	0.3	1.6	*	1.3	-	-	-	0.4	0.5	0.4
10-14	0.5	*	0.3	3.3	*	1.8	-	-	-	1.0	0.2	0.6
15-19	2.2	0.9	1.6	59.8	9.1	34.7	*	*	*	11.4	2.3	6.9
20-24	5.2	1.1	3.2	167.7	12.4	88.2	*	-	*	30.3	2.9	16.8
25-29	3.4	1.0	2.2	147.4	11.8	75.7	*	-	*	26.8	2.9	14.9
30-34	3.4	1.4	2.4	104.5	11.1	54.7	*	*	*	18.0	3.0	10.6
35-44	2.6	1.5	2.1	50.9	7.8	27.7	6.0	*	3.5	8.8	2.4	5.6
45-54	1.4	0.6	1.0	28.0	5.2	15.6	*	-	*	4.5	1.2	2.8
55-64	1.2	0.6	0.9	12.8	*	6.0	*	-	*	2.5	0.5	1.5
65-74	0.8	0.5	0.6	9.8	*	5.0	-	-	-	1.7	0.6	1.1
75+	0.6	*	0.4	6.0	*	2.6	-	-	-	1.1	0.3	0.6
Total	1.9	0.8	1.3	48.7	5.5	25.9	2.3	*	1.3	8.5	1.5	4.9

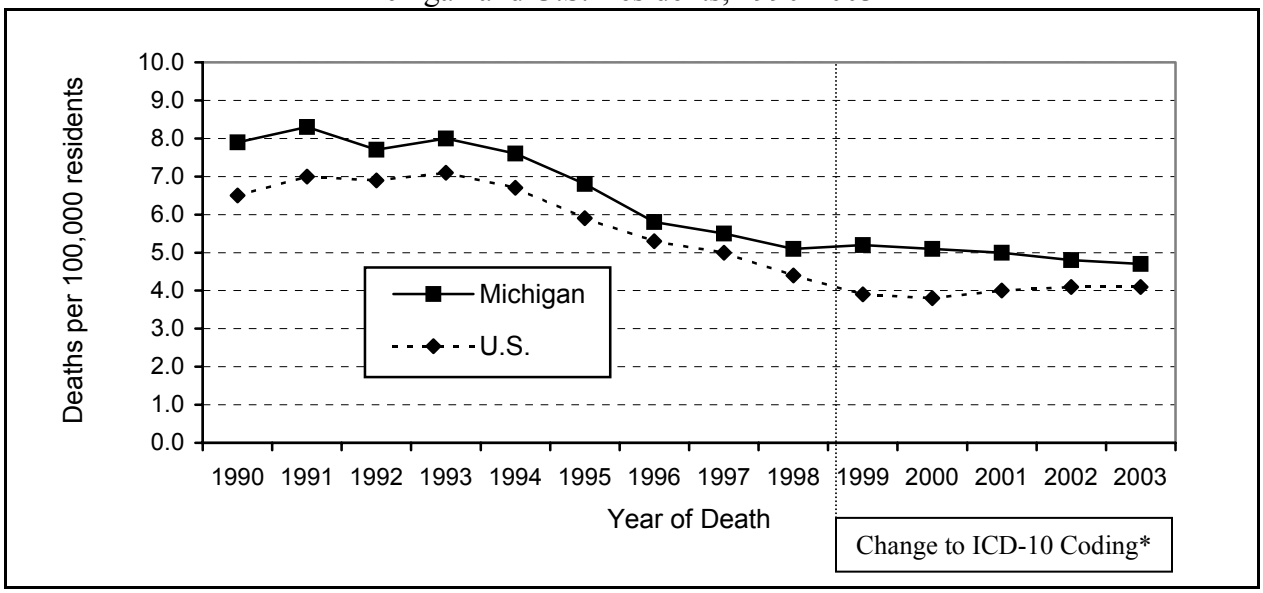
* Reliable rate could not be calculated. See Methods.
Rates are number of deaths per 100,000 population.
Decedent with unknown race (n=1) not illustrated but included in totals.
Sources: Vital Records and Health Data Development Section, MDCH
U.S. Census

TABLE 5
Number of Deaths and Death Rates Due to Firearm Homicides
By Year of Death, Michigan and U.S. Residents, 1990-2003

Year	Number		Rate	
	Michigan	U.S.	Michigan	U.S.
1990	731	16,218	7.9	6.5
1991	783	17,746	8.3	7.0
1992	728	17,488	7.7	6.9
1993	762	18,253	8.0	7.1
1994	732	17,527	7.6	6.7
1995	662	15,551	6.8	5.9
1996	562	14,037	5.8	5.3
1997	543	13,252	5.5	5.0
1998	506	11,798	5.1	4.4
CHANGE TO ICD-10 CODING*				
1999	512	10,828	5.2	3.9
2000	503	10,801	5.1	3.8
2001	497	11,348	5.0	4.0
2002	487	11,829	4.8	4.1
2003	473	11,920	4.7	4.1

Rates are number of deaths per 100,000 population.

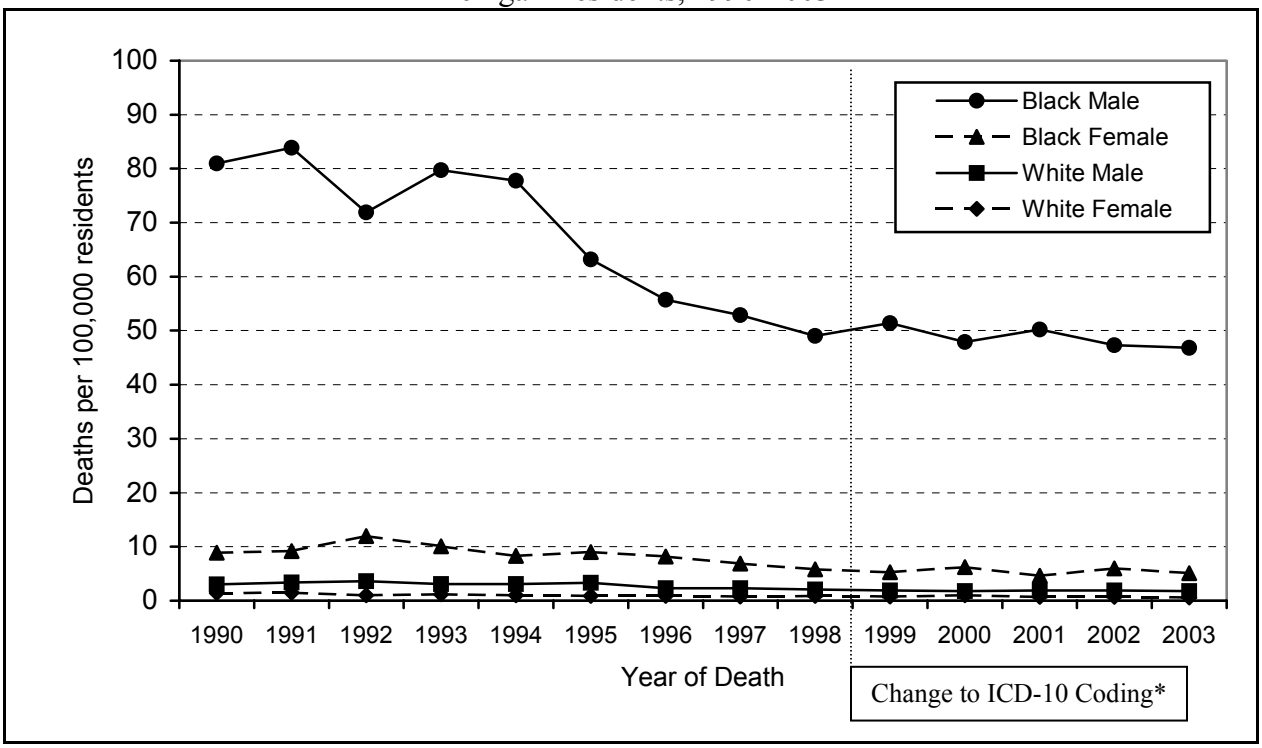
FIGURE 2
Firearm Homicide Death Rates
Michigan and U.S. Residents, 1990-2003



1990-1998: ICD-9 codes E965.0-.4
1999-2003: ICD-10 codes X93 – X95
Sources: Vital Records and Health Data Development Section, MDCH
Web-based Injury Statistics Query and Reporting System, U.S. Centers for Disease Control and Prevention
U.S. Census Data

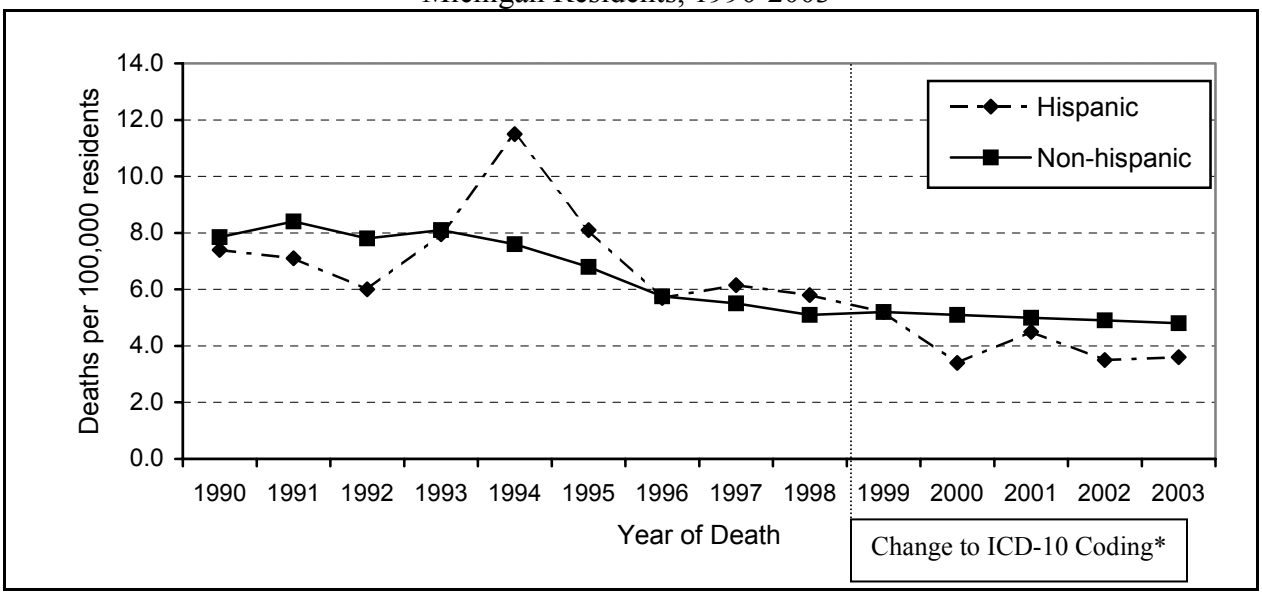
* Starting in 1999, cause of death has been coded using ICD-10, a completely different coding system than ICD-9. The estimated comparability ratio[9] for firearm homicide is 1.0019. Thus, the coding change to ICD-10 from ICD-9 by itself would have the effect of increasing the number of cases and corresponding rates by 0.19%.

FIGURE 3
Firearm Homicide Death Rates by Race and Sex
Michigan Residents, 1990-2003



Source: Vital Records and Health Data Development Section, MDCH

FIGURE 4
Firearm Homicide Death Rates by Hispanic Status
Michigan Residents, 1990-2003



Source: Web-based Injury Statistics Query and Reporting System (WISQARS), CDC

* Starting in 1999, cause of death has been coded using ICD-10, a completely different coding system than ICD-9. The estimated comparability ratio for firearm homicide is 1.0019.[9]

TABLE 6
Average Annual Numbers and Rates of Deaths Due to Firearm Homicides
By County of Residence, Michigan Residents, 1999-2003

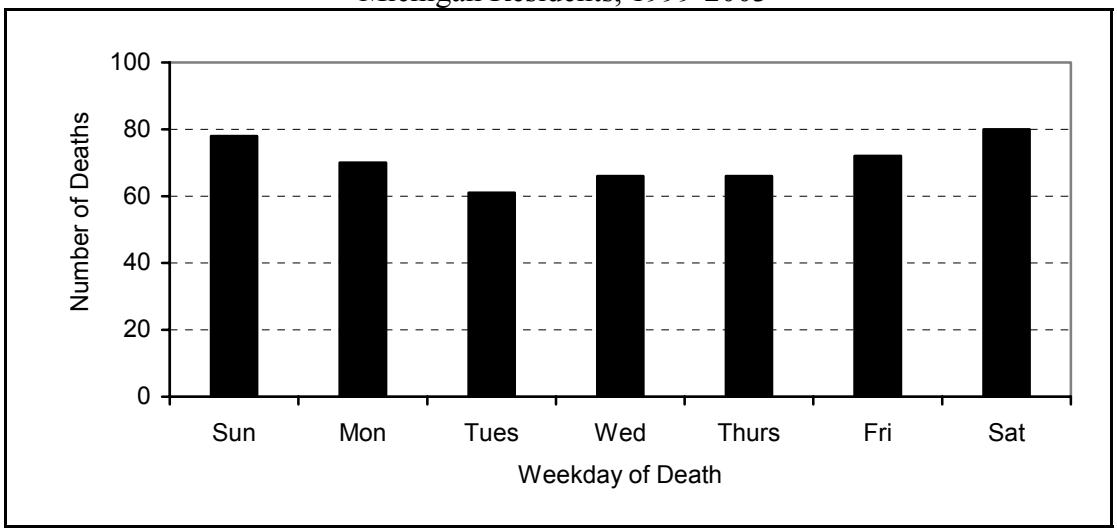
County	Number	Rate	County	Number	Rate
Alcona	-	-	Lapeer	1	1.6
Alger	0	*	Leelanau	-	-
Allegan	1	1.1	Lenawee	1	1.4
Alpena	-	-	Livingston	1	0.7
Antrim	0	*	Luce	0	*
Arenac	0	*	Mackinac	-	-
Baraga	-	-	Macomb	13	1.6
Barry	-	-	Manistee	-	-
Bay	1	*	Marquette	1	*
Benzie	0	*	Mason	-	-
Berrien	6	3.5	Mecosta	0	*
Branch	1	*	Menominee	0	*
Calhoun	4	2.9	Midland	0	*
Cass	2	3.1	Missaukee	-	-
Charlevoix	-	-	Monroe	1	*
Cheboygan	0	*	Montcalm	0	*
Chippewa	0	*	Montmorency	-	-
Clare	1	*	Muskegon	3	2.0
Clinton	-	-	Newaygo	0	*
Crawford	0	*	Oakland	26	2.2
Delta	0	*	Oceana	-	-
Dickinson	-	-	Ogemaw	0	*
Eaton	2	1.5	Ontonagon	-	-
Emmet	-	-	Osceola	-	-
Genesee	28	6.4	Oscoda	1	*
Gladwin	0	*	Otsego	0	*
Gogebic	0	*	Ottawa	1	*
Grand Traverse	1	*	Presque Isle	-	-
Gratiot	0	*	Roscommon	0	*
Hillsdale	0	*	Saginaw	12	5.6
Houghton	-	-	St. Clair	1	0.8
Huron	0	*	St. Joseph	1	*
Ingham	6	2.1	Sanilac	-	-
Ionia	0	*	Schoolcraft	-	-
Iosco	0	*	Shiawassee	0	*
Iron	0	*	Tuscola	0	*
Isabella	1	*	Van Buren	1	1.8
Jackson	2	1.5	Washtenaw	7	2.1
Kalamazoo	5	2.2	Wayne, out-county	42	3.8
Kalkaska	-	-	Detroit City	304	32.5
Kent	9	1.5	Wexford	0	*
Keweenaw	-	-			
Lake	1	*	Michigan	494	4.9

* Reliable rate could not be calculated. See Methods.
Includes ICD-10 codes: X93 - X95.
Rates are number of deaths per 100,000 population.
Sources: Vital Records and Health Data Development Section, MDCH
U.S. Census

Weekday and Month of Death

The weekday and month of death are used here as markers for weekday and month of incident. Figure 5 illustrates the average annual number of deaths by weekday of death. More deaths occurred on Saturday and Sunday than any other days. (More non-fatal hospital admissions occurred on weekends as well (see Table B-3 in Appendix B).)

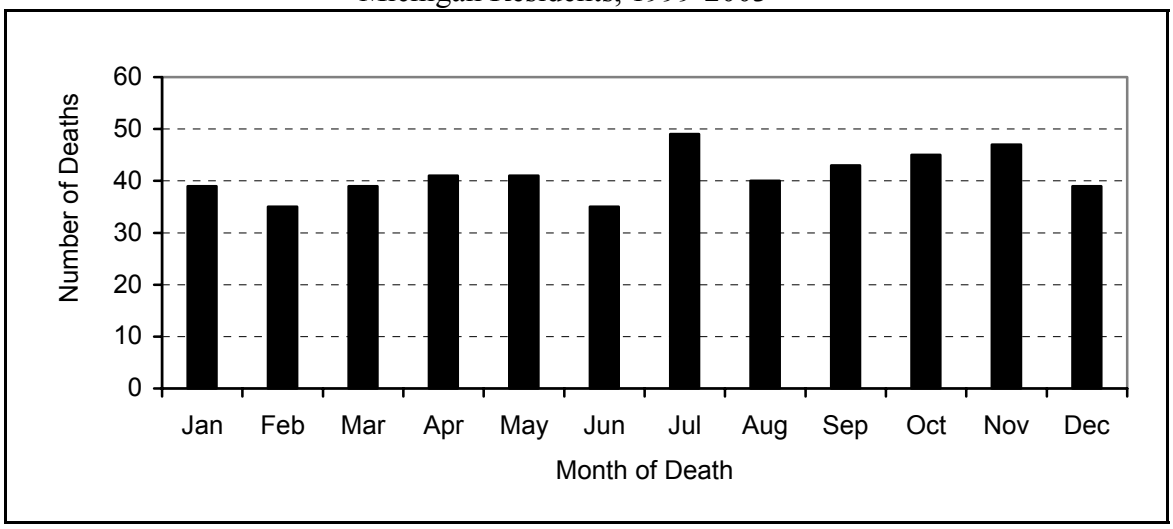
FIGURE 5
Average Annual Number of Firearm Homicides by Weekday of Death
Michigan Residents, 1999-2003



Source: Vital Records and Health Data Development Section, MDCH

Figure 6 illustrates the average annual number of deaths by month of death. July had the greatest number of deaths. More deaths occurred in autumn months — September, October, November — than any other season although the difference between autumn deaths and the seasonal average was not statistically significant. (Non-fatal hospital admissions were elevated during July-October (see Table B-4 in Appendix B).)

FIGURE 6
Average Annual Number of Firearm Homicides by Weekday of Death
Michigan Residents, 1999-2003



Source: Vital Records and Health Data Development Section, MDCH

Data from Supplementary Homicide Reports (SHR) provide information on firearm homicides that is not available using death certificate data. (The type of firearm used was specified in only 7% of death certificates for 1999-2003 and this source contains no information on suspects.) According to the SHR, there were 2,316 murders during 1999-2003 that involved a firearm. (The annual number of firearm murders per SHR (463) differs from the annual number of firearm homicides per death certificates (494) due to differences in case definition in the two data systems.[*]).

Firearm Type

Table 7 illustrates types of firearms used in these offenses. Handguns were used in 85% of cases in which the type of firearm was specified.

TABLE 7
Average Annual Number of Firearm Murders by Weapon Type
Michigan Incidents, 1999-2003

Type of Firearm	Number	%
Handgun	289	62.4
Rifle	25	5.4
Shotgun	25	5.4
Other gun	2	0.4
Unspecified	122	26.3
Total	463	100.0

Source: Supplementary Homicide Reports

[*] SHR excludes justifiable homicide (e.g., self-defense) whereas this would be counted as a homicide in death certificate data. SHR pertains to incidents occurring within Michigan, thus it would not capture murders of Michigan residents out of state, but would include non-resident murders within the state.

Suspect Characteristics

The relationship between the victim and the suspect was missing for 58% of firearm homicide cases (Table 8). The victim and suspect were defined as strangers in 19% of the cases where the relationship was specified.

Demographic characteristics of suspects were frequently missing in SHRs: 40% of all cases had no information on suspect age, sex, or race. Among the cases with known demographics, 95% of the suspects were male and 81% were black (Table 9). Information on ethnicity of suspects was unknown in 96% of cases.

TABLE 8
Average Annual Number of Firearm Murders
by Victim-Suspect Relationship
Michigan Incidents, 1999-2003

Relationship	Number	%
Spouse	13	2.8
Former spouse	1	0.2
Current boyfriend/girlfriend	9	1.9
Family member	16	3.5
Acquaintance*	103	22.2
Otherwise known*	16	3.5
Stranger	36	7.8
Unknown	269	58.1
Total	463	100.0

Source: Supplementary Homicide Reports

TABLE 9
Annual Average Number of Firearm Murders
by Age, Sex, and Race of the Suspect
Michigan Incidents, 1999-2003

Age	White			Black			Unknown			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
<15	1	-	1	1	-	1	-	-	-	1	-	1
15-24	15	1	15	77	2	79	1	-	1	93	3	96
25-34	10	1	11	48	3	52	1	-	1	59	4	63
35-44	9	2	10	16	2	18	0	-	0	25	4	29
45-54	7	0	7	8	1	8	0	-	0	15	1	16
55+	5	1	6	3	1	3	0	-	0	8	1	9
Unknown	2	-	2	57	0	57	3	0	189[1]	62	0	248[1]
Total	48	4	52	210	9	219	6	0	192[1]	264	13	463[1,2]

1. Includes cases where sex was unspecified (929 over the five-year period or about 186 per year).
2. Includes cases where race was categorized as "Other" (five over the five-year period (one per year)).
Source: Supplementary Homicide Reports

* Ex-boyfriends/girlfriends are not identified uniquely within Supplementary Homicide Reports; they are likely contained within either the "Acquaintance" or "Otherwise known" categories.

Firearm Suicides
Firearms were the leading mechanism for committing suicide in Michigan during 1999-2003. Over half (53%) of suicides involved firearms (Table 10).

Consistent with the ICD-10 codes provided for firearm homicides, the type of firearm (e.g., handgun, rifle, shotgun) generally could not be ascertained using the ICD-10 codes provided on death certificates. In 74% of cases, the type of firearm was not specified.

TABLE 10
Average annual number of suicides, by mechanism
Michigan residents, 1999-2003

Mechanism	Number	%
Firearm	540	52.9
Suffocation/Hanging	223	21.9
Poisoning	191	18.7
Sharp Object	20	2.0
Drowning	11	1.1
Jump	9	0.9
Other	22	2.2
Unspecified	4	0.4
Total	1,020	100.0

Cells do not add to total due to rounding.
Source: Vital Records and Health Data Development Section, MDCH

Victim Demographics
Table 11 illustrates the average annual number of firearm suicides among Michigan residents during 1999-2003 by age group, sex, and race of the victim. The corresponding annual rates are presented in Table 12. The firearm suicide rate for whites was 66% greater than the rate for blacks. The rate for males was more than eight times the rate for females. Overall, rates were consistent between ages 20 and 54. Thereafter, rates increased with age. The highest overall firearm suicide rate was for white males aged 75 and older. Their rate was five times the overall rate. (The average annual number of non-fatal hospitalizations for firearm suicide attempts was too small (N=42) to provide robust information on demographic groups (see Tables B-5 and B-6 in Appendix B).)

Trends
Between 1990 and 2003, the Michigan firearm suicide rate was highest in 1991 (7.0 deaths per 100,000 residents) and lowest in 2003 (5.1 per 100,000) (Table 13). The rate decreased 24% from 1990 to 2003 (Figure 7). National rates had the same pattern as Michigan rates over the fourteen year period. National rates consistently exceeded Michigan rates, generally between 9% and 17% each year.

While rates decreased for all race-sex groups, the greatest decrease was among black males (45%) (Figure 8 and Table A-5 in Appendix A). There were too few cases among Hispanics to evaluate trends among this group. Their rates overall were consistently lower than non-Hispanics (Table A-6 in Appendix A).

TABLE 11
Average Annual Number of Deaths Due to Firearm Suicides
By Age, Race, and Sex
Michigan Residents, 1999-2003

Age	White			Black			Other			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	-	-	-	-	-	-	-	-	-	-	-	-
1-4	-	-	-	-	-	-	-	-	-	-	-	-
5-9	-	-	-	-	-	-	-	-	-	-	-	-
10-14	3	1	4	-	-	-	-	-	-	3	1	4
15-19	20	2	23	4	1	5	1	-	1	26	3	29
20-24	32	2	34	5	0	6	1	0	1	38	3	40
25-29	32	5	37	7	1	7	1	-	1	40	5	45
30-34	32	5	36	7	1	8	-	0	0	39	6	45
35-44	80	11	92	9	2	11	1	0	1	90	14	104
45-54	79	10	89	4	2	6	1	0	1	84	12	96
55-64	51	8	59	4	0	4	1	-	1	56	8	64
65-74	48	4	52	3	1	4	1	-	1	52	5	56
75+	53	3	55	2	0	2	-	-	-	54	3	57
Total	430	51	481	45	7	52	6	1	7	481	59	540

Includes ICD-10 codes: X72 – X74.
Decedents with unknown race (n=4) not illustrated but included in totals.
Numbers in columns and rows may not total exactly due to rounding.
Source: Vital Records and Health Data Development Section, MDCH

TABLE 12
Average Annual Death Rates Due to Firearm Suicides
By Age, Race, and Sex
Michigan Residents, 1999-2003

Age	White			Black			Other			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	-	-	-	-	-	-	-	-	-	-	-	-
1-4	-	-	-	-	-	-	-	-	-	-	-	-
5-9	-	-	-	-	-	-	-	-	-	-	-	-
10-14	1.1	*	0.7	-	-	-	-	-	-	0.9	*	0.5
15-19	6.8	0.8	3.9	6.8	*	4.0	12.2	-	6.2	7.1	0.9	4.1
20-24	11.5	0.8	6.2	9.9	*	5.2	*	*	*	11.1	0.8	6.0
25-29	12.9	1.9	7.5	12.8	*	6.8	*	-	*	12.6	1.7	7.2
30-34	11.0	1.6	6.4	13.8	*	7.2	-	*	*	10.9	1.6	6.3
35-44	12.0	1.7	6.9	8.7	1.7	5.0	*	*	2.6	11.4	1.7	6.5
45-54	13.0	1.7	7.4	5.0	1.6	3.2	*	*	*	11.9	1.7	6.7
55-64	13.5	1.9	7.6	8.8	*	4.2	*	-	*	12.9	1.7	7.1
65-74	18.6	1.4	9.3	11.2	*	5.5	*	-	*	17.9	1.4	8.9
75+	26.8	0.8	10.4	8.1	*	3.3	-	-	-	24.8	0.8	9.7
Total	10.6	1.2	5.8	6.4	0.9	3.5	4.1	*	2.4	9.8	1.2	5.4

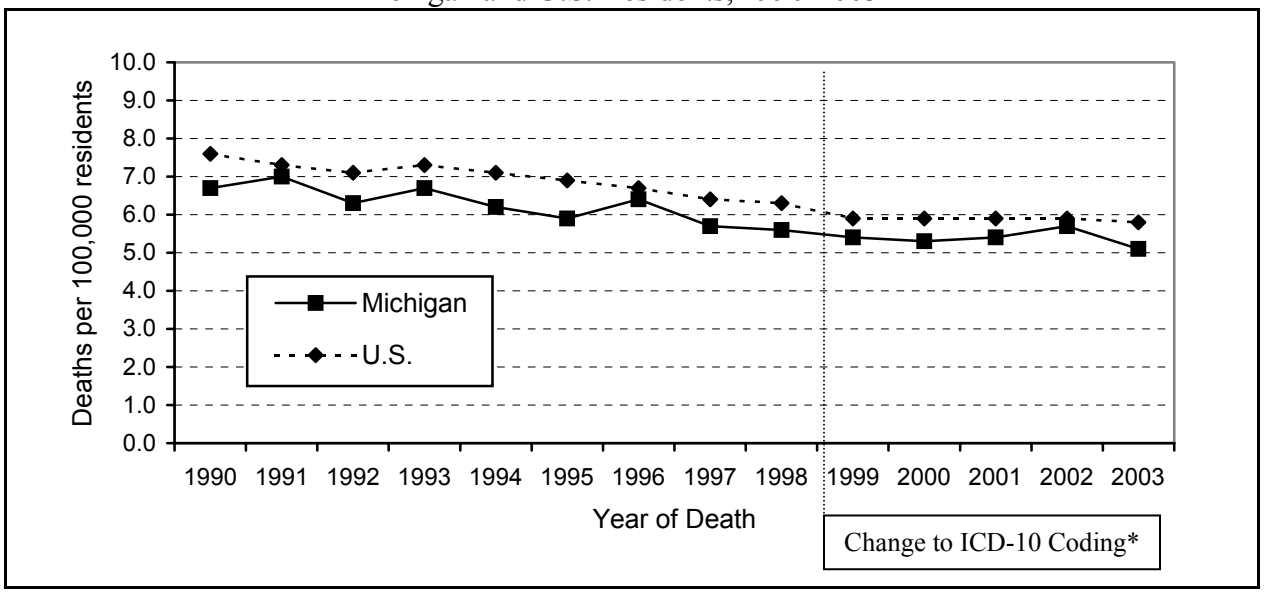
* Reliable rate could not be calculated. See Methods.
Rates are number of deaths per 100,000 population.
Decedents with unknown race (n=4) not illustrated but included in totals.
Sources: Vital Records and Health Data Development Section, MDCH
U.S. Census

TABLE 13
Number of Deaths and Death Rates Due to Firearm Suicides
By Year of Death, Michigan and U.S. Residents, 1990-2003

Year	Number		Rate	
	Michigan	U.S.	Michigan	U.S.
1990	628	18,885	6.7	7.6
1991	658	18,526	7.0	7.3
1992	597	18,169	6.3	7.1
1993	638	18,940	6.7	7.3
1994	594	18,765	6.2	7.1
1995	572	18,503	5.9	6.9
1996	629	18,166	6.4	6.7
1997	555	17,566	5.7	6.4
1998	551	17,424	5.6	6.3
CHANGE TO ICD-10 CODING*				
1999	538	16,599	5.4	5.9
2000	529	16,586	5.3	5.9
2001	540	16,869	5.4	5.9
2002	574	17,108	5.7	5.9
2003	519	16,907	5.1	5.8

Rates are number of deaths per 100,000 population.

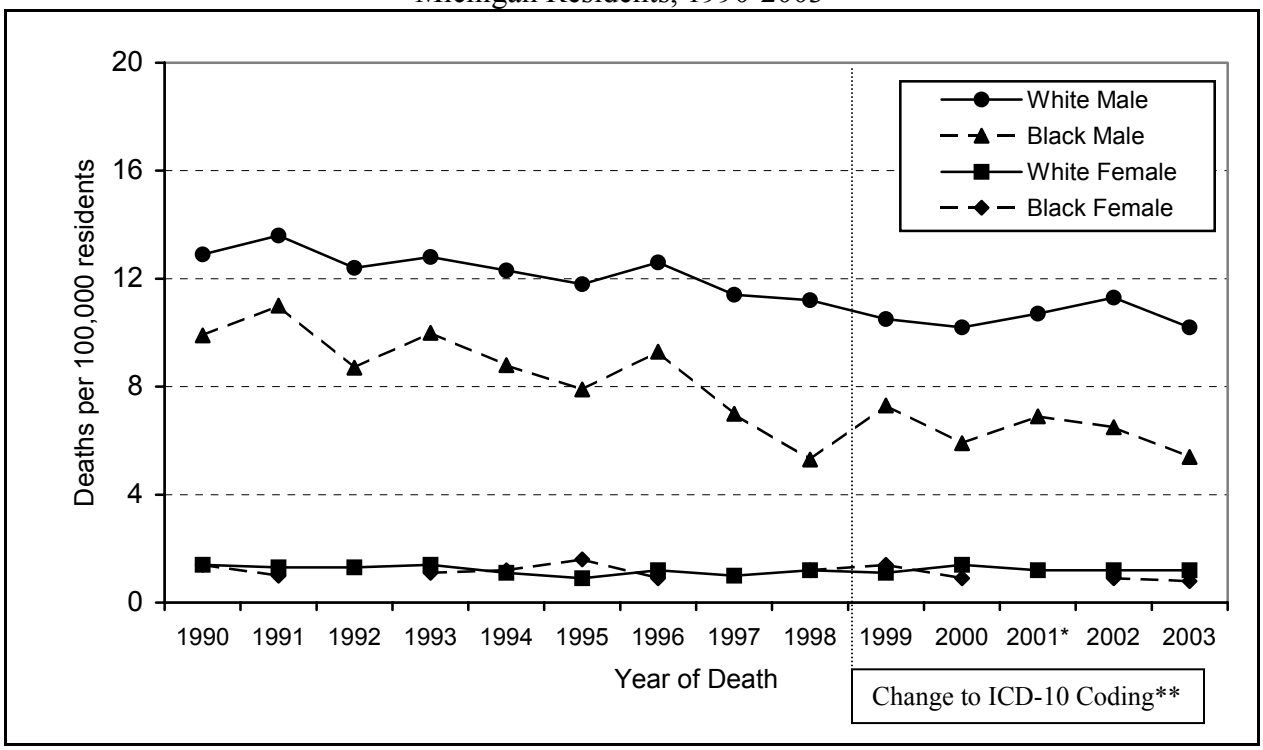
FIGURE 7
Firearm Suicide Death Rates
Michigan and U.S. Residents, 1990-2003



1990-1998: ICD-9 codes E955.0 – E955.4
1999-2003: ICD-10 codes X72 – X74
Sources: Vital Records and Health Data Development Section, MDCH
Web-based Injury Statistics Query and Reporting System, U.S. Centers for Disease Control and Prevention
U.S. Census Data

* Starting in 1999, cause of death has been coded using ICD-10, a completely different coding system than ICD-9. The estimated comparability ratio[9] for firearm suicide is 1.0012. Thus, the coding change to ICD-10 from ICD-9 by itself would have the effect of increasing the number of cases and corresponding rates by 0.12%.

FIGURE 8
Firearm Suicide Death Rates by Race and Sex
Michigan Residents, 1990-2003



* Reliable rate could not be calculated for black females in 2001. See Methods.
Source: Vital Records and Health Data Development Section, MDCH

County of Residence

The average annual number of firearm suicides during 1999-2003 and the corresponding rate for each county and the City of Detroit are presented in Table 14. No geographic pattern is evident. Rates generally were highest in lower populated counties, but these rates were based on small numbers (< 6 per year) of cases. None of the ten most populous counties had rates that exceeded the state rate.

** Starting in 1999, cause of death has been coded using ICD-10, a completely different coding system than ICD-9. The estimated comparability ratio[9] for firearm suicide is 1.0012. Thus, the coding change to ICD-10 from ICD-9 by itself would have the effect of increasing the number of cases and corresponding rates by 0.12%.

TABLE 14
Average Annual Numbers and Rates of Deaths Due to Firearm Suicides
By County of Residence, Michigan Residents, 1999-2003

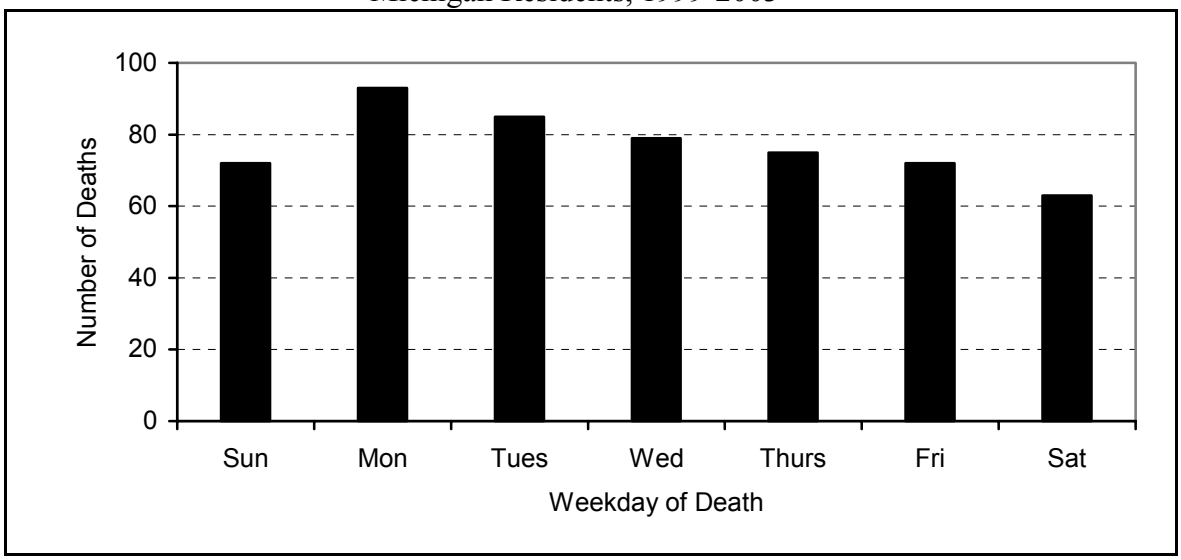
County	Number	Rate	County	Number	Rate
Alcona	2	15.5	Lapeer	7	8.0
Alger	1	12.2	Leelanau	1	*
Allegan	5	4.6	Lenawee	6	6.0
Alpena	3	9.0	Livingston	10	6.2
Antrim	2	7.7	Luce	0	*
Arenac	2	9.3	Mackinac	1	*
Baraga	1	*	Macomb	40	4.9
Barry	3	5.6	Manistee	3	11.3
Bay	9	8.0	Marquette	6	8.7
Benzie	1	*	Mason	5	16.1
Berrien	8	4.9	Mecosta	2	3.9
Branch	3	7.0	Menominee	2	7.9
Calhoun	8	6.1	Midland	4	4.5
Cass	5	9.4	Missaukee	2	10.9
Charlevoix	2	6.1	Monroe	8	5.5
Cheboygan	2	6.7	Montcalm	4	5.8
Chippewa	4	10.4	Montmorency	1	13.3
Clare	4	12.8	Muskegon	10	5.7
Clinton	4	6.1	Newaygo	3	6.6
Crawford	2	11.0	Oakland	54	4.5
Delta	3	8.9	Oceana	2	7.4
Dickinson	2	8.1	Ogemaw	4	17.5
Eaton	6	5.7	Ontonagon	1	18.1
Emmet	2	5.0	Osceola	2	8.6
Genesee	23	5.3	Oscoda	2	16.9
Gladwin	2	6.8	Otsego	1	*
Gogebic	2	9.0	Ottawa	9	3.5
Grand Traverse	3	4.0	Presque Isle	1	9.7
Gratiot	2	5.2	Roscommon	3	10.9
Hillsdale	3	6.4	Saginaw	11	5.4
Houghton	2	5.6	St. Clair	8	5.1
Huron	3	9.5	St. Joseph	4	6.7
Ingham	12	4.4	Sanilac	3	7.2
Ionia	5	8.1	Schoolcraft	1	15.8
Iosco	2	8.8	Shiawassee	5	6.7
Iron	1	10.8	Tuscola	4	7.5
Isabella	3	4.4	Van Buren	5	7.0
Jackson	10	6.5	Washtenaw	11	3.2
Kalamazoo	12	4.8	Wayne, out-county	60	5.3
Kalkaska	1	*	Detroit City	41	4.3
Kent	20	3.4	Wexford	3	8.5
Keweenaw	-	-			
Lake	2	17.2	Michigan	540	5.4

* Reliable rate could not be calculated. See Methods.
Includes ICD-10 codes: X72 – X74.
Rates are number of deaths per 100,000 population.
Sources: Vital Records and Health Data Development Section, MDCH
U.S. Census

Weekday and Month of Death

Figure 9 illustrates the average annual number of deaths by weekday of death. More deaths occurred on Monday than any other day.

FIGURE 9
Average Annual Number of Firearm Suicides by Weekday of Death
Michigan Residents, 1999-2003



Source: Vital Records and Health Data Development Section, MDCH

There was no clear seasonal pattern for firearm suicides. Interestingly, however, while the fewest deaths occurred in December, there were a relatively large number of firearm suicide deaths in January. (See Table A-8 in Appendix A).

(There was no clear weekday or monthly pattern of non-fatal hospitalizations for firearm suicide attempts (see Tables B-7 and B-8 in Appendix B.)

Lethality of Firearms

Firearms are a lethal mechanism of injury, especially in suicides. Between 1999 and 2003, an average of 540 Michigan residents committed suicide with a firearm each year while during that same period, there were an average of only 42* non-fatal hospitalizations for attempted suicide with a firearm. Their lethality is also evident in homicides. During 1999 – 2003, 494 Michigan residents were killed annually in firearm homicides and 736* had non-fatal hospitalizations for firearm assault injuries. This two-to-three death-hospitalization ratio is substantially greater than the overall injury death-hospitalization ratio of one to nine.

Firearm Ownership and Storage Practices

In the 2002 Michigan Behavioral Risk Factor Survey, 40.5% of respondents reported having a firearm at home (Table 15).[11] Reported ownership varied by demographic characteristics: middle-aged and older adults were more likely to own a firearm than young adults; males were more likely than females; whites more likely than African Americans; and those in higher

* The cause of injury was not specified in 15% of hospitalizations between 1999 and 2003, thus, some non-fatal firearm injury hospitalizations may not have been identified.

income households more likely than those in lower income households. An estimated 3.3% of respondents indicated that they kept a loaded, unlocked gun at home. Men were more likely than women to report having a loaded, unlocked gun (5.6% vs. 1.2%).

The same set of firearm ownership and storage practice questions was included in the BRFS for all states in 2002. Nationally, 32.6% (95% confidence interval: 32.2-32.9%) of adults reported that firearms were kept in or around their home. The prevalence of adults with loaded and unlocked household firearms was 4.3% (95% CI: 4.2-4.5%).[12]

TABLE 15
Demographic Characteristics of Firearm Owners
Michigan, 2002
(Estimates and 95% confidence intervals)

Demographic Characteristic	Have Loaded Unlocked Gun at Home (%)	Have No Gun (%)
Total	3.3 ± 0.6	59.5 ± 1.6
Age		
18-34 years	2.5 ± 1.0	65.3 ± 3.2
35-54 years	3.8 ± 1.0	56.3 ± 2.5
≥ 55 years	3.3 ± 1.0	57.6 ± 2.7
Gender		
Male	5.6 ± 1.1	52.6 ± 2.5
Female	1.2 ± 0.4	65.8 ± 2.0
Race		
White	3.2 ± 0.6	55.8 ± 1.7
Black	4.7 ± 2.1	78.4 ± 4.5
Education		
High school grad or less	2.6 ± 0.8	59.0 ± 2.5
Some college or grad	3.8 ± 0.8	59.8 ± 2.1
Household Income		
< $35,000	2.9 ± 0.9	67.3 ± 2.6
≥ $35,000	3.6 ± 0.8	52.7 ± 2.2

Tables excludes "Don't know" responses and refusals (these comprised 2.7% of responses to the initial firearm ownership question).
Source: 2002 Michigan Behavioral Risk Factor Survey. Table taken directly from the report on the 2002 BRFS as developed by the Michigan Department of Community Health.[11]

Cost of Firearm Homicides and Suicides

Estimated medical and work-loss costs due to firearm homicides and suicides occurring in 2003 are summarized in Table 16. Tables illustrating how these figures were obtained are provided in Appendix C. These tables present the number of cases within specified age groups and the associated unit cost within each age group. Total costs are the sum of age group specific costs.

Work-loss costs are much higher than medical costs. Firearm homicides were more costly than firearm suicides even though there were a greater number of the latter. This is due to firearm homicide victims generally being younger than firearm suicide victims.

TABLE 16
Estimated Medical and Work-loss Costs Associated with Firearm Homicides and Firearm Suicides Occurring to Michigan Residents in 2003

Injury Type	Number of Deaths	Medical Costs (in 1,000's)	Work-loss Costs (in 1,000's)	Total (in 1,000's)
Firearm Homicide	473	$3,273	$517,909	$521,182
Firearm Suicide	519	$3,321	$409,738	$413,059

DISCUSSION

Study Limitations

Supplementary Homicide Reports are the best source of information on homicide suspects and they provide more specific information on the type of firearm used than death certificate data. Often, however, SHR's are completed before comprehensive homicide investigations have taken place and much of this information is missing. Firearm type was missing in about one-quarter of cases, and in more than half the cases, at least one demographic characteristic (e.g., age, sex, race) and victim-suspect relationship was unknown.

There was a similar limitation regarding data from the Behavioral Risk Factor Survey. Nearly one-quarter (22%) of eligible respondents contacted did not complete the interview. In addition, a small percentage (2.7%) of those asked the series of questions on firearm ownership and storage practices either refused to answer or replied "Don't know." Those who did not respond either to the survey or to the specific question may not have been similar to those who did respond. This bias would cause survey estimates to be inaccurate.

Finally, the estimates of cost were generated by applying a nationally developed paradigm to Michigan data. The process did not involve obtaining actual direct or indirect costs associated with injuries occurring in Michigan.

Current MDCH Activities

Child and Adolescent Violence Prevention: Violence is a leading cause of death for Michigan's young people and Michigan's Surgeon General has listed violence prevention among the ten top priorities for public health intervention. The time has come to create a collaborative and inclusive environment in which frank discussions can occur around what must happen—at the individual, relationship, societal, and community levels—to address child and adolescent violence. The focus of these discussions must be on the primary prevention of perpetration, while addressing issues not only affecting potential perpetrators, but also potential victims and bystanders.

In 2004, the Injury and Violence Prevention Section within the Michigan Department of Community Health (MDCH) received a two-year cooperative agreement from the Centers for Disease Control and Prevention to accomplish four key goals: 1) prepare a state report card on the current status of activities and policies in the state related to child and adolescent violence and its prevention; 2) create a collaborative environment in which to plan for the future, both for the state and within MDCH; 3) produce a state strategic plan; and 4) lay the foundation for plan implementation through a readiness assessment at the state and local levels.

The program will provide information on risk and protective factors for various forms of violence including youth suicide, child maltreatment, teen dating violence, sexual violence, school violence, community violence and bullying. Research findings will be used to guide the development of prevention strategies that can address the major risk and protective factors for these forms of violence. The final documents resulting from the assessment and planning activities will be widely distributed through many avenues, including extensive electronic distribution and publicity.

Suicide Prevention: The Injury and Violence Prevention Section, working with other partners within MDCH and from other state departments, is currently building a comprehensive suicide prevention program, based on the Suicide Prevention Plan for Michigan. Initial efforts are

underway to develop a focus on youth suicide prevention, followed by expansion of the program to include older age groups.

Future Directions

In April 2002, the Michigan Injury Prevention Task Force developed a strategic plan for building a comprehensive injury prevention and control program in the state. One injury priority area identified in the plan was firearm-related suicide and homicide. The plan includes the following recommendations for infrastructure to support suicide and homicide prevention, data collection, evidence-based interventions, technical support and training, and public policy:

Infrastructure

- MDCH, in collaboration with the Michigan Partnership to Prevent Gun Violence and other interested agencies, should facilitate the formation and functioning of a communication/collaboration network focusing on firearm morbidity and mortality.

- MDCH, in collaboration with the Michigan Partnership to Prevent Gun Violence and other interested agencies, should investigate funding to develop a focus on firearm-related injuries, specifically developing and implementing an effective, evidence-based firearm injury prevention and education safety program.

Data

- MDCH, in collaboration with the Michigan Partnership to Prevent Gun Violence and other interested agencies, should strongly support efforts to collect comprehensive firearm morbidity and mortality data.

- MDCH should facilitate the collection of firearm mortality data and participate in the National Violent Death Reporting System.

- MDCH should identify the demographics of individuals with the highest rates of intentional firearm injuries.

- The Injury Prevention Clearinghouse should serve as a warehouse for the most current and comprehensive firearm-related homicide and suicide data available in the state.

Interventions

- MDCH, in collaboration with the Michigan Partnership to Prevent Gun Violence and other interested agencies, should develop and implement criteria for determining effective or promising programs, practices and interventions in firearm-related homicide and suicide.

- MDCH, in collaboration with the Michigan Partnership to Prevent Gun Violence and other interested agencies, should support the implementation at state and local levels of effective, evidence-based firearm safety education initiatives.

- MDCH, in partnership with university-based researchers, should examine and evaluate the effectiveness of current state-sponsored firearm injury prevention efforts.

- MDCH, in collaboration with the Michigan Partnership to Prevent Gun Violence, the Michigan Association of Suicidology, and other interested agencies, should identify effective evidence-based suicide intervention strategies and incorporate these into their firearm safety initiatives.

- Resources should be sought to develop and implement a public information campaign on firearm safety, with an emphasis on informed decision-making around firearm ownership and changing the social norms around parents asking about firearm ownership and storage in the homes that their children visit, that would collaborate with existing state firearm safety and education programs.

- MDCH should work with the Michigan Chapter of the American Academy of Pediatrics to educate their members and strongly encourage them to engage in anticipatory guidance on the issues of firearms, suicide and violence with patients and their families.

- MDCH and the Family Independence Agency (now the Department of Human Services) should continue to support primary and secondary prevention and intervention programs for intimate partner violence and sexual assault.

- MDCH should require that all MDCH funded firearm injury, violence, intimate partner violence, and sexual assault prevention efforts should have both a process evaluation and impact assessment.

Technical Support and Training

- MDCH should collaborate with other state agencies' training efforts focusing on firearm safety and education.

Public Policy

- MDCH should promote through firearm safety education and public service campaigns that all firearm injuries and deaths in Michigan are a public health issue.

- MDCH, in collaboration with the Michigan Partnership to Prevent Gun Violence and other interested agencies, should continue to support strong enforcement of substance abuse laws and firearm regulations in Michigan and incorporate discussion of these into firearm safety initiatives sponsored by MDCH.

- MDCH should partner with other state and local agencies to develop firearm safety campaigns that target identified high-risk populations.

- MDCH, in partnership with university-based researchers, should examine and evaluate the impact and the effectiveness of Michigan's current CCW (concealed-carry weapons) laws in reducing firearm injuries in Michigan.

In 2006, the Firearm Workgroup of the Injury Prevention Task Force will be reconvened to document progress toward these recommendations and to develop an action plan to provide direction for future initiatives related to firearm-related suicide and homicide prevention.

APPENDIX A

Data Tables for Firearm Homicides and Firearm Suicides

TABLE A-1
Firearm Homicides by Race and Sex
Michigan Residents, 1990-2003

Year	White Male		White Female		Black Male		Black Female	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1990	116	3.0	57	1.4	493	81.0	62	8.9
1991	132	3.4	61	1.5	521	83.9	65	9.2
1992	142	3.6	40	1.0	454	71.9	86	12.0
1993	123	3.1	47	1.2	512	79.7	73	10.1
1994	121	3.1	41	1.0	507	77.8	61	8.3
1995	132	3.3	39	0.9	418	63.2	67	9.0
1996	90	2.3	36	0.9	372	55.7	61	8.2
1997	92	2.3	32	0.8	357	52.9	52	6.9
1998	86	2.1	38	0.9	334	49.0	44	5.8
1999	77	1.9	34	0.8	354	51.4	41	5.3
2000	74	1.8	43	1.0	333	47.9	48	6.2
2001	78	1.9	28	0.7	351	50.2	36	4.6
2002	77	1.9	28	0.7	333	47.3	47	6.0
2003	72	1.8	27	0.6	331	46.8	40	5.1

Sources: Vital Records and Health Data Development Section, MDCH
U.S. Census Data

TABLE A-2
Firearm Homicides by Hispanic Status
Michigan Residents, 1990-2003

Year	Hispanic		Non-hispanic	
	Number	Rate	Number	Rate
1990	15	7.4	715	7.9
1991	15	7.1	773	8.4
1992	13	6.0	721	7.8
1993	18	7.9	752	8.1
1994	27	11.5	713	7.6
1995	20	8.1	639	6.8
1996	15	5.7	546	5.7
1997	17	6.1	527	5.5
1998	17	5.8	490	5.1
1999	16	5.2	496	5.2
2000	11	3.4	492	5.1
2001	15	4.5	483	5.0
2002	12	3.5	476	4.9
2003	13	3.6	464	4.8

Source: Web-based Injury Statistics Query and Reporting System,
U.S. Centers for Disease Control and Prevention

TABLE A-3
Average Annual Number of Firearm Homicides by
Weekday of Death, 1999-2003

Day of Death	Number	%
Sunday	78	15.8
Monday	70	14.2
Tuesday	61	12.3
Wednesday	66	13.4
Thursday	66	13.4
Friday	72	14.6
Saturday	80	16.2
Total	494	100.0

Source: Vital Records and Health Data Development Section, MDCH

TABLE A-4
Average Annual Number of Firearm Homicides by
Month of Death, 1999-2003

Month of Death	Number	%
January	39	7.9
February	35	7.1
March	39	7.9
April	41	8.3
May	41	8.3
June	35	7.1
July	49	9.9
August	40	8.1
September	43	8.7
October	45	9.1
November	47	9.5
December	39	7.9
Total	494	100.0

Source: Vital Records and Health Data Development Section, MDCH

TABLE A-5
Firearm Suicides by Race and Sex
Michigan Residents, 1990-2003

Year	White Male		White Female		Black Male		Black Female	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1990	494	12.9	56	1.4	60	9.9	10	1.4
1991	525	13.6	54	1.3	68	11.0	7	1.0
1992	481	12.4	51	1.3	55	8.7	4	*
1993	501	12.8	57	1.4	64	10.0	8	1.1
1994	482	12.3	44	1.1	57	8.8	9	1.2
1995	466	11.8	35	0.9	52	7.9	12	1.6
1996	503	12.6	50	1.2	62	9.3	7	0.9
1997	456	11.4	43	1.0	47	7.0	4	*
1998	450	11.2	48	1.2	36	5.3	9	1.2
1999	425	10.5	46	1.1	50	7.3	11	1.4
2000	414	10.2	57	1.4	41	5.9	7	0.9
2001	435	10.7	49	1.2	48	6.9	5	*
2002	460	11.3	51	1.2	46	6.5	7	0.9
2003	416	10.2	50	1.2	38	5.4	6	0.8

Sources: Vital Records and Health Data Development Section, MDCH
U.S. Census Data

TABLE A-6
Firearm Suicides by Hispanic Status
Michigan Residents, 1990-2003

Year	Hispanic		Non-hispanic	
	Number	Rate	Number	Rate
1990	7	3.5	608	6.7
1991	6	2.8	646	7.0
1992	12	5.5	581	6.3
1993	7	3.1	626	6.7
1994	9	3.8	585	6.2
1995	14	5.7	558	5.9
1996	6	2.3	622	6.6
1997	4	*	546	5.7
1998	7	2.4	540	5.7
1999	4	*	534	5.6
2000	4	*	522	5.4
2001	11	3.3	527	5.4
2002	8	2.3	566	5.8
2003	4	*	514	5.3

* Reliable rate could not be calculated. See Methods.
Source: Web-based Injury Statistics Query and Reporting System,
U.S. Centers for Disease Control and Prevention

TABLE A-7
Average Annual Number of Firearm Suicides by
Weekday of Death, 1999-2003

Day of Death	Number	%
Sunday	72	13.3
Monday	93	17.2
Tuesday	85	15.7
Wednesday	79	14.6
Thursday	75	13.9
Friday	72	13.3
Saturday	63	11.7
Total	540	100.0

Source: Vital Records and Health Data Development Section, MDCH

TABLE A-8
Average Annual Number of Firearm Suicides by
Month of Death, 1999-2003

Month of Death	Number	%
January	50	9.3
February	46	8.5
March	45	8.3
April	47	8.7
May	51	9.4
June	44	8.1
July	48	8.9
August	40	7.4
September	43	8.0
October	44	8.1
November	45	8.3
December	36	6.7
Total	540	100.0

Source: Vital Records and Health Data Development Section, MDCH

APPENDIX B

Data Tables for Non-fatal Firearm Injury Hospitalizations

TABLE B-1
Average Annual Number of Non-fatal Firearm Assault Injury Hospitalizations
by Age, Sex and Race, Michigan Residents, 1999-2003

Age	White			Black			Other			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	0	-	0	1	1	2	0	0	0	2	1	2
1-4	-	-	-	-	0	0	-	-	-	-	1	1
5-9	0	-	0	1	1	2	0	-	0	2	1	3
10-14	1	0	1	5	2	7	0	-	0	6	2	8
15-19	9	1	11	74	7	81	4	1	4	91	10	100
20-24	14	1	16	144	14	158	8	-	8	173	16	189
25-29	12	1	12	113	10	123	6	-	6	136	10	146
30-34	8	2	10	71	9	80	4	-	4	88	11	99
35-44	17	2	20	75	11	85	6	1	8	105	15	119
45-54	8	2	10	32	3	35	1	1	2	44	6	49
55-64	2	0	2	6	1	6	1	-	1	9	1	10
65-74	1	0	1	2	-	2	-	-	-	3	0	4
75+	0	0	0	3	1	4	1	-	1	5	1	6
Total	72	10	83	528	59	587	32	3	35	662	74	736

Cause of injury coding rate: 85%
For 31 cases a year (158 total), race was unspecified.
Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE B-2
Average Annual Rate of Non-fatal Firearm Assault Injury Hospitalizations
by Age, Sex and Race, Michigan Residents, 1999-2003

Age	White			Black			Other			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	*	-	*	9.3	*	7.1	*	*	*	2.3	*	1.8
1-4	-	-	-	-	*	*	-	-	-	-	*	*
5-9	*	-	*	1.6	1.7	1.7	*	-	*	0.4	0.4	0.4
10-14	*	*	*	7.1	3.1	5.2	*	-	*	1.5	0.7	1.1
15-19	3.1	0.5	1.8	126.7	12.6	70.2	33.1	*	19.4	24.6	2.7	13.9
20-24	5.2	0.5	2.9	275.4	25.1	147.3	67.2	-	33.6	50.9	4.7	28.1
25-29	4.6	*	2.5	219.8	16.6	112.4	38.8	-	19.1	43.1	3.3	23.3
30-34	2.9	0.6	1.7	136.0	15.2	71.6	25.8	-	13.2	24.5	3.0	13.8
35-44	2.6	0.4	1.5	75.6	9.4	40.0	27.6	5.3	16.5	13.3	1.8	7.5
45-54	1.3	0.3	0.8	38.1	3.2	19.1	9.2	*	6.2	6.2	0.8	3.5
55-64	0.4	*	0.3	12.8	*	6.4	15.7	-	7.7	2.1	*	1.1
65-74	*	*	0.2	8.4	-	3.5	-	-	-	1.1	*	0.6
75+	*	*	*	17.1	*	7.7	*	-	*	2.1	*	0.9
Total	1.8	0.2	1.0	75.5	7.7	39.8	22.8	1.8	12.2	13.5	1.5	7.4

* Reliable rate could not be calculated. See Methods.
Cause of injury coding rate: 85%
Rates are the number of hospitalizations per 100,000 residents.
Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE B-3
Average Annual Number of Non-fatal Firearm Assault Injury Hospitalizations
by Weekday of Hospital Admission
Michigan Residents, 1999-2003

Day of Hospital Admission	Number	%
Sunday	135	18.4
Monday	88	12.0
Tuesday	91	12.4
Wednesday	93	12.6
Thursday	97	13.1
Friday	94	12.7
Saturday	139	18.8
Total	736	100.0

Cause of injury coding rate: 85%
Source: MI Resident Inpatient Files,
Division for Vital Records and Health Statistics, MDCH

TABLE B-4
Average Annual Number of Non-fatal Firearm Assault Injury Hospitalizations
by Month of Hospital Admission
Michigan Residents, 1999-2003

Month of Hospital Admission	Number	%
January	62	8.5
February	38	5.1
March	55	7.5
April	58	7.9
May	61	8.3
June	58	7.9
July	68	9.3
August	71	9.6
September	70	9.5
October	67	9.1
November	65	8.9
December	62	8.5
Total	736	100.0

Cause of injury coding rate: 85%
Source: MI Resident Inpatient Files,
Division for Vital Records and Health Statistics, MDCH

TABLE B-5
Average Annual Number of Non-fatal Firearm Suicide Attempt Injury Hospitalizations
by Age, Sex and Race, Michigan Residents, 1999-2003

Age	White			Black			Other			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	-	-	-	0	-	0	-	-	-	0	-	0
1-4	-	-	-	-	-	-	-	-	-	-	-	-
5-9	-	-	-	-	-	-	-	-	-	-	-	-
10-14	-	-	-	0	-	0	0	-	0	0	-	0
15-19	1	0	2	1	0	1	0	-	0	3	0	4
20-24	3	0	3	2	0	2	-	-	-	5	0	5
25-29	2	1	2	0	-	0	0	-	0	3	1	4
30-34	2	1	3	1	0	1	-	-	-	4	1	5
35-44	5	1	6	1	0	1	0	-	0	7	2	9
45-54	4	1	4	1	0	1	-	0	0	5	2	7
55-64	1	1	2	-	-	-	0	-	0	1	1	2
65-74	1	0	1	0	0	0	-	-	-	1	1	2
75+	3	0	3	0	-	0	0	-	0	4	0	4
Total	21	6	26	7	2	9	1	0	1	34	8	42

Cause of injury coding rate: 85%
Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE B-6
Average Annual Rate of Non-fatal Firearm Suicide Attempt Injury Hospitalizations
by Age, Sex and Race, Michigan Residents, 1999-2003

Age	White			Black			Other			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	-	-	-	*	-	*	-	-	-	*	-	*
1-4	-	-	-	-	-	-	-	-	-	-	-	-
5-9	-	-	-	-	-	-	-	-	-	-	-	-
10-14	-	-	-	*	-	*	*	-	*	*	-	*
15-19	0.5	*	0.3	*	*	*	*	-	*	0.9	*	0.5
20-24	0.9	*	0.5	3.4	*	1.9	-	-	-	1.4	*	0.7
25-29	0.7	*	0.5	*	-	*	*	-	*	1.0	*	0.6
30-34	0.6	0.4	0.5	2.3	*	1.3	-	-	-	1.0	0.4	0.7
35-44	0.7	0.2	0.5	*	*	0.6	*	-	*	0.9	0.3	0.6
45-54	0.6	*	0.4	*	*	0.8	-	*	*	0.7	0.2	0.5
55-64	*	*	0.2	-	-	-	*	-	*	0.3	*	0.2
65-74	*	*	0.2	*	*	*	-	-	-	0.4	*	0.3
75+	1.4	*	0.6	*	-	*	*	-	*	1.7	*	0.7
Total	0.5	0.1	0.3	1.0	0.2	0.6	0.8	*	0.5	0.7	0.2	0.4

* Reliable rate could not be calculated. See Methods.
Cause of injury coding rate: 85%
Rates are the number of hospitalizations per 100,000 residents.
Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE B-7
Average Annual Number of Non-fatal Firearm Suicide Attempt Injury Hospitalizations
by Weekday of Hospital Admission
Michigan Residents, 1999-2003

Day of Hospital Admission	Number	%
Sunday	8	18.6
Monday	6	14.8
Tuesday	5	11.9
Wednesday	6	13.3
Thursday	7	16.7
Friday	5	12.4
Saturday	5	12.4
Total	42	100.0

Cause of injury coding rate: 85%
Source: MI Resident Inpatient Files,
Division for Vital Records and Health Statistics, MDCH

TABLE B-8
Average Annual Number of Non-fatal Firearm Suicide Attempt Injury Hospitalizations
by Month of Hospital Admission
Michigan Residents, 1999-2003

Month of Hospital Admission	Number	%
January	3	8.1
February	3	7.1
March	2	4.3
April	3	8.1
May	3	7.6
June	4	9.5
July	4	10.5
August	3	6.2
September	4	10.0
October	4	8.6
November	4	9.0
December	5	11.0
Total	42	100.0

Cause of injury coding rate: 85%
Source: MI Resident Inpatient Files,
Division for Vital Records and Health Statistics, MDCH

APPENDIX C

Tables Illustrating Derivation of Medical and Work-loss Costs of Firearm Homicides and Firearm Suicides Occurring in 2003

TABLE C-1
Derivation of Medical Costs Associated with Firearm Homicides
Occurring Among Michigan Residents in 2003

Age (years)	Estimated Cost per Case 1997[1] (in 1,000's)	Estimated Cost per Case 2003[2] (in 1,000's)	Number of Cases 2003	Estimated Cost 2003 (in 1,000's)
<1	7.4	8.5	0	0.0
1-4	7.4	8.5	2	17.0
5-12	7.4	8.5	5	42.5
13-15	7.4	8.5	3	25.5
16-20	7.4	8.5	54	459.0
21-44	6.1	7.0	337	2,359.0
45-64	4.6	5.3	64	339.2
65+	3.4	3.9	8	31.2
Total			473	3,273.4

1. From Robinson.[5]
2. Assumes inflation rate of 14.58% between July 1997 and July 2003.[13]

TABLE C-2
Derivation of Work-loss Costs Associated with Firearm Homicides
Occurring Among Michigan Residents in 2003

Age (years)	Estimated Cost per Case 1997[1] (in 1,000's)	Estimated Cost per Case 2003[2] (in 1,000's)	Number of Cases 2003	Estimated Cost 2003 (in 1,000's)
<1	768.2	880.2	0	0.0
1-4	762.1	873.2	2	1,746.4
5-12	910.9	1,043.7	5	5,218.5
13-15	1,021.7	1,170.7	3	3,512.1
16-20	1,090.5	1,249.5	54	67,473.0
21-44	1,044.0	1,196.2	337	403,119.4
45-64	495.1	567.3	64	36,307.2
65+	58.0	66.5	8	532.0
Total			473	517,908.6

1. From Robinson.[5] Work-loss cost per case was not presented in the Robinson report; this had to be derived using total annual cost and annual incidence, figures which were presented in the report.
2. Assumes inflation rate of 14.58% between July 1997 and July 2003.[13]

TABLE C-3
Derivation of Medical Costs Associated with Firearm Suicides
Occurring Among Michigan Residents in 2003

Age (years)	Estimated Cost per Case 1997[1] (in 1,000's)	Estimated Cost per Case 2003[2] (in 1,000's)	Number of Cases 2003	Estimated Cost 2003 (in 1,000's)
<1	0.0	0.0	0	0.0
1-4	0.0	0.0	0	0.0
5-12	0.0	0.0	1	9.1[3]
13-15	7.9	9.1	4	36.4
16-20	7.9	9.1	24	218.4
21-44	6.5	7.4	225	1,665.0
45-64	5.0	5.7	174	991.8
65+	3.8	4.4	91	400.4
Total			519	3,321.1

1. From Robinson.[5]
2. Assumes inflation rate of 14.58% between July 1997 and July 2003.[13]
3. Robinson defined the cost per case of deaths in this age category as $0.0 because there were no deaths in this age group in 1997-1998. The one death among 5-12 year olds in 2003 was assumed to have medical costs similar to 13-15 and 16-20 year olds ($9,100).

TABLE C-4
Derivation of Work-loss Costs Associated with Firearm Suicides
Occurring Among Michigan Residents in 2003

Age (years)	Estimated Cost per Case 1997[1] (in 1,000's)	Estimated Cost per Case 2003[2] (in 1,000's)	Number of Cases 2003	Estimated Cost 2003 (in 1,000's)
<1	0.0	0.0	0	0.0
1-4	0.0	0.0	0	0.0
5-12	0.0	0.0	1	1,168.7[3]
13-15	1,020.0	1,168.7	4	4,674.8
16-20	1,089.4	1,248.2	24	29,956.8
21-44	1,043.9	1,196.1	225	269,122.5
45-64	495.3	567.5	174	98,745.0
65+	58.2	66.7	91	6,069.7
Total			519	409,737.5

1. From Robinson.[5] Work-loss cost per case was not presented in the Robinson report; this had to be derived using total annual cost and annual incidence, figures which were presented in the report.
2. Assumes inflation rate of 14.58% between July 1997 and July 2003.[13]
3. Robinson defined the cost per case of deaths in this age category as $0.0 because there were no deaths in this age group in 1997-1998. The one death among 5-12 year olds in 2003 was assumed to have work-loss costs similar to 13-15 year olds ($1,168,700).

APPENDIX D

Definitions of Two Types of Cost Due to Firearm Homicide and Suicide

The following descriptions are taken from the report "The Medical Costs of Injury in Michigan."[5] For more detailed information, please refer to the report.

Medical Cost

Medical costs include costs associated with burial and medical examiner investigation. Depending on when the person died, costs may also include emergency transport from the scene, emergency department care, hospitalization, and nursing home care.

Work-loss Cost

These losses include victims' lost wages and the value of lost household work, as well as fringe benefits and the administrative costs of processing compensation for lost earnings through litigation, insurance or public welfare. Work losses by family and friends who care for injured victims also are included. The costs are the present value of all expected costs over the victim's expected lifespan. For each death, the years of life lost were estimated from a life expectancy table.

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13. Rate of inflation between 1997 and 2003 was determined using the Inflation Rate Calculator on the following website: http://inflationdata.com/inflation/Inflation_Rate/InflationCalculator.asp.